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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/511,310	10/15/2004	Hiroshi Hasegawa	F-8422	6603
28107	7590	06/09/2006		
JORDAN AND HAMBURG LLP 122 EAST 42ND STREET SUITE 4000 NEW YORK, NY 10168			EXAMINER TRIEU, THERESA	
			ART UNIT 3748	PAPER NUMBER

DATE MAILED: 06/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/511,310

Applicant(s)

HASEGAWA ET AL.

Examiner

Theresa Trieu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5/7, 6/7, 7, 8 is/are rejected.
- 7) ☒ Claim(s) 5/8, 7/8, 9, 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Oct. 15, 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date Oct. 15, 2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Receipt and entry of Applicants' Preliminary Amendment filed on Oct. 15, 2004 is acknowledged.

Claims 1-4 have been canceled. Claims 5 and 6 have been amended. Claims 7-10 have been added. Accordingly, claims 5-10 are pending in this application.

Drawings

1. Figures 4, 5A, 5B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "side plates" recited in claim 8, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing

should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. Regarding claims 5-8, the word "means" is preceded by the word(s) "of an operating fluid; of expansion; of an axis" in an attempt to use a "means" clause to recite a claim element as a means for performing a specified function. However, since no function is specified by the word(s) preceding "means," it is impossible to determine the equivalents of the element, as required by 35 U.S.C. 112, sixth paragraph. See *Ex parte Klumb*, 159 USPQ 694 (Bd. App. 1967).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 5 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by any one of King et al. (King) (Patent Number 3,652,191) or Miller (Publication Number GB 2,107,789).

Regarding claims 5 and 7, King (as shown in Figs. 1 and 2) or Miller (as shown in Fig.1) discloses an expander having a plurality of operating chambers for expanding a high-pressure operating fluid and a shaft for obtaining a rotating power by the expansion of the operating fluid in the operating chambers comprising: a first discharge port (65 in King; 12 in Miller) which firstly communicates to the operating chamber involving in a discharging process and a second discharge port (62 in King; 12 in Miller) which secondly communicates to the same operating chamber; a valve mechanism (66a in King; 14 in Miller) preventing the operating fluid from flowing back being provided to the first discharge port; and a discharge chamber (31 in King; 13 in Miller) temporarily storing the operating fluid flowing out from the first and second discharge ports, wherein a pressure applied to the operating chamber which has a maximum volume immediately before it reaches the first discharge port (65 in King; 12 in Miller) is set lower than a pressure applied to the discharge chamber, and the expander is set so that the volume of the operating chamber is compressed again immediately after it reaches the first discharge port to release the valve mechanism when the recompressed pressure exceeds the

pressure applied to the discharge chamber; the expander being operated by an operating fluid expanding into a gas-liquid two phase from a liquid phase or a supercritical phase.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over King in view of Viegas et al. (Viegas) (Patent Number 5,947,712).

King discloses the invention as recited above; however, King fails to disclose the operating fluid containing carbon dioxide.

Viegas teaches that it is conventional in the rotary vane art to utilize a carbon dioxide for operating fluid (see col. 5, line 1-3). It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized the carbon dioxide, as taught by

Viegas in the King apparatus, since the use thereof would have improved the performance of the rotary vane device.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over King in view of Shimizu et al. (Shimizu) (Patent Number 3,988,083).

As shown in Figs. 1 and 2, King discloses a vane rotary expander including: a cylinder (28) having a cylindrical inner wall; a side plates (22, 24); a rotor (47) disposed in the cylinder; vanes (53) inserted into the vane grooves formed in the rotor; a shaft (35) integrally formed with the rotor, wherein a power for rotating the shaft is obtained by expanding a high pressure operating fluid in the operating chamber, comprising: first and second discharge ports (65, 62); a valve mechanism (66a) provided to the first discharge port (65); a discharge chamber (31) storing the operating fluid flossing out from the first and second discharge ports (65,62), wherein a pressure applied to the operating chamber (33) which has a maximum volume immediately before it reaches the first discharge port (65) is set lower than a pressure applied to the discharge chamber, and the expander is set so that the volume of the operating chamber (33) is compressed again immediately after it reaches the first discharge port (65) to release the valve mechanism (66a) when the recompressed pressure exceeds the pressure applied to the discharge chamber. however, King fails to disclose a clearance between the inner wall of the cylinder and the outer circumference segment of the rotor.

Shimuzu teaches that it is conventional in the rotary vane art to utilize a clearance (not numbered; however, clearly seen in Fig. 2) between the inner wall of the cylinder (15) and the outer circumference segment of the rotor (12). It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have utilized the clearance, as

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taught by Shimuzu in the King apparatus, since the use thereof would have improved the wear resistance and improved the performance and useful life of the rotary vane device.

Allowable Subject Matter

7. Claims 5/8, 6/8, 9 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Prior Art

The IDS (PTO-1449) filed on Oct. 15, 2004 has been considered. An initialized copy is attached hereto.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of three patents: Dawes (U.S. Patent Number 2,463,155), Hayashi (U.S. Patent Number 4,389,170) and Foerg (Publication Number DE 4002506), each further discloses a state of the art.

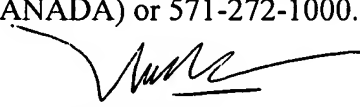
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Theresa Trieu whose telephone number is 571-272-4868. The examiner can normally be reached on Monday-Friday 8:30am- 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion can be reached on 571-272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TT
June 2, 2006



Theresa Trieu
Primary Examiner
Art Unit 3748